

Measurements of low mass dielectrons in Au+Au collisions with the HBD upgrade of the PHENIX detector

Mihael Makek, for the PHENIX collaboration

Dileptons are valuable probes in the investigation of the hot and dense matter formed in heavy ion collisions, since they interact only electromagnetically and thus their path from the interaction region to the detectors is almost undisturbed. They can provide information about the matter properties in the early stages of the collisions where deconfinement and chiral symmetry restoration are expected to take place. However, the measurements of dileptons in heavy ion collisions are challenging due to the overwhelming yield of π^0 Dalitz decays and photon conversions, which produce a large combinatorial background especially in the low invariant mass region ($m_{ee} < 1 \text{ GeV}/c^2$).

The PHENIX spectrometer has been upgraded with a Hadron Blind Detector (HBD) with the purpose of reducing the combinatorial background from the dielectron mass spectrum. The HBD is a windowless Cherenkov detector, operating with pure CF_4 , using triple GEM elements with a CsI photocathode and pad readout. The HBD reduces the combinatorial background by exploiting the small opening angle of the π^0 Dalitz and conversion pairs. It was successfully operated during Run 9 and Run 10 at RHIC in the measurements of e^+e^- pairs in p+p collisions at $\sqrt{s}=200 \text{ GeV}$ and in Au+Au collisions at $\sqrt{s_{NN}} = 200 \text{ GeV}$, 62 GeV and 39 GeV. In this talk a full account of the HBD and present results of the dielectron analysis in Au+Au collisions at $\sqrt{s_{NN}}=200 \text{ GeV}$ with improved signal to background ratio, will be presented.